

IN THE CLAIMS

What is claimed is:

1. A retractor for use through a trocar port, comprising:

5 a shaft having at least a first section having a first mechanical interface and a second section having a second mechanical interface for engaging the first mechanical interface, the first section and second section being selectively movable from a first, generally longitudinally-aligned configuration along an axis defined through the shaft and the first mechanical interface is disengaged from the second mechanical interface, to a second configuration wherein the second section is disposed at an angle relative
10 to a longitudinal axis of the shaft and the first mechanical interface is engaged with the second mechanical interface; and

at least one cable extending through the shaft and being operatively secured to the second section, the cable being remotely actuatable to move the second section from the first to the second configuration upon selective translation of the cable.

15 2. A retractor according to claim 1 wherein the first and second mechanical interfaces cooperate to align the first section and the second section and engage the first and second sections with one another upon movement from the first configuration to the second configuration.

20 3. A retractor according to claim 1 wherein the first section includes a cam-like interface and the second section includes a complementary cam-like interface which rotatably and translatably engage one another upon actuation of the cable and movement of the first section and the second section from the first configuration to the second configuration.

25 4. A retractor according to claim 1 wherein the shaft includes an outer sleeve which houses the first and second sections.

5. A retractor according to claim 1 wherein at least one of the first section and the second section include a tongue which engages a corresponding recess disposed within the other of the first section and the second section to facilitate alignment and engagement of the first section and the second section relative to one
30 another during movement from the first configuration to the at least one additional

second configuration.

6. A retractor according to claim 1, further comprising a hinge disposed between the first section and the second section.

7. A retractor according to claim 1 further comprising a living hinge
5 disposed between the first section and the second section.

8. A retractor according to claim 6 wherein one of the first section and the second section includes a stop for controlling the angular disposition of the first section and the second section when disposed in the at least one additional second configuration.

10 9. An organ retractor, comprising:
a tube having a lumen extending therethrough and defining a longitudinal axis;
and

a distal section, an intermediate section and a proximal section disposed within the lumen of the tube, wherein the retractor has a first configuration in which the
15 distal, intermediate and proximal sections are substantially aligned with the longitudinal axis and disassociated with one another, and at least one second configuration in which the intermediate section and the distal section are engaged with one another so that the distal section is disposed at an angle with respect to the longitudinal axis.

20 10. The organ retractor of claim 9, further comprising a first cable extending through the proximal section and the intermediate section, and operatively secured to the distal section, wherein translation of the first cable in a proximal direction causes the distal section to operatively engage the intermediate section at an angle relative to the longitudinal axis.

25 11. The organ retractor of claim 10, further comprising a second cable extending through the proximal section and operatively secured to the intermediate section, wherein translation of at least one of the first and second cables in a proximal direction causes the intermediate section to operatively engage the proximal section.

12. The organ retractor of claim 11, wherein the distal section includes at least one first mechanical interface formed at a proximal end thereof and the intermediate section includes at least one second mechanical interface formed on a side surface thereof, the second mechanical interface being complementary with the first mechanical interface, wherein when the distal and intermediate sections engage one another, the first mechanical interface and the second mechanical interface maintain the distal section at an angle with respect to the longitudinal axis.

13. The organ retractor of claim 12, wherein the proximal section includes at least one third mechanical interface formed at a distal end thereof and the intermediate section includes at least one fourth mechanical interface formed at a proximal end thereof, the fourth mechanical interface being complementary to the third mechanical interface, wherein when the proximal and intermediate sections engage one another, the third mechanical interface and the fourth mechanical interface maintain the proximal and intermediate sections substantially aligned with the longitudinal axis.

14. The organ retractor of claim 13, wherein the proximal section includes at least one longitudinally oriented passage extending therethrough, wherein the first and the second cables extend through the at least one longitudinal passage.

15. The organ retractor of claim 14, wherein the intermediate section includes a substantially angular passage extending therethrough, a first portion of the angular passage opening on the proximal surface of the intermediate section, and a second portion of the angular passage opening on the side surface of the intermediate section, wherein the second cable extends through the angular passage.

16. The organ retractor of claim 12, wherein the second mechanical interface of the intermediate section is in the form of a socket and wherein the first mechanical interface of the distal section is in the form of a tongue-like member which extends therefrom and is complementary to the socket formed in the proximal section.

17. The organ retractor of claim 9, wherein a cable in the form of a ribbon extends through the proximal section and the intermediate section and is affixed to the distal section.

18. The organ retractor of claim 12, wherein the second mechanical interface of the intermediate section includes a helical camming surface and wherein the first mechanical interface of the distal section includes a helical camming surface which is complementary to the helical camming surface of the proximal section.

5 19. The organ retractor of claim 12, wherein the third mechanical interface of the proximal section and the fourth mechanical interface of the intermediate section each comprise a helical camming surfaces which intersect one another.

20. The organ retractor of claim 9, wherein the tube is fabricated from a flexible material.

10 21. An organ retractor, comprising:
an elongated shaft defining a longitudinal axis, the shaft having a first section and a second section pivotably connected to one another; and
a first cable extending through the first section and operatively connected to the second section for manipulating the retractor from a first configuration to at least
15 one second configuration, wherein in the first configuration the first and second sections are substantially aligned with the longitudinal axis and in the at least one second configuration the second section is at an angle with respect to the longitudinal axis.

22. The organ retractor of claim 21, wherein the second section is
20 pivotably connected to the first section by a mechanical hinge.

23. The organ retractor of claim 21, wherein the second section is pivotably connected to the first section by a living hinge.

24. The organ retractor of claim 21, wherein the first section has a distal surface and the second section has a proximal surface, the distal surface comprising
25 an angled surface that faces the proximal surface of the second section.

25. The organ retractor of claim 24, further including a film extending between the first and second sections.

26. The organ retractor of claim 24, further including at least one stop member provided on at least one of the distal surface and the proximal surface.

27. The organ retractor of claim 21, further comprising:
a third section pivotably connected to the second section; and
a second cable extending through the first section and the second section and
operatively connected to the third section for manipulating the retractor from the first
5 configuration to the at least one second configuration.

28. The organ retractor of claim 27, further comprising a first mechanical
interface provided on the first section, a second mechanical interface provided on the
second section for engaging the first mechanical interface, a third mechanical
interface provided on the second section, and a fourth mechanical interface on the
10 third section for engaging the third mechanical interface.

29. An organ retractor, comprising:
a shaft defining a longitudinal axis; and
a plurality of finger elements operatively engagable with a distal end of the
shaft, wherein the retractor has a first configuration in which the plurality of finger
15 elements are substantially aligned with the longitudinal axis and at least one second
configuration in which the plurality of finger elements are disposed at an angle with
respect to the longitudinal axis.

30. The organ retractor of claim 29, wherein each of the plurality of finger
elements is disassociated from the shaft, and wherein the retractor includes a plurality
20 of cables extending through the shaft, each cable having a bundle of cords extending
therefrom and into a corresponding finger element, each bundle of cords being
operatively connected to the corresponding finger element such that retraction of the
plurality of cables manipulates the retractor from the first configuration to the at least
one second configuration.

25 31. The organ retractor of claim 30, wherein the bundle of cords extend
between the plurality of finger elements.

32. The organ retractor of claim 31, wherein a distal end of the shaft
includes a plurality of sockets configured and dimensioned to selectively receive a
flange formed at a proximal end of a corresponding finger element.

30

33. The organ retractor of claim 32, wherein individual cords of the bundle of cords exit a respective finger element through ports formed therein.

34. The organ retractor of claim 29, further including a pair of plates pivotably connected to a distal end of the shaft and wherein the plurality of finger
5 elements are affixed to the pair of plates, wherein the pair of plates have a first orientation in which the retractor is in the first configuration and a second orientation in which the retractor is in the at least one second configuration.

35. The organ retractor of claim 34, further including at least one wire extending between adjacent finger elements.

10 36. An organ retractor, comprising:
a shaft defining a longitudinal axis and a bore for receiving a temperature changing medium, the shaft being fabricated from a shape memory substance, wherein the shaft has a first configuration which is substantially linear when at a first temperature and at least one second configuration which is non-linear when at a
15 second temperature.

37. The organ retractor of claim 36, wherein the temperature changing medium comprises a quantity of liquid received in the bore.

38. The organ retractor of claim 36, wherein the shaft is fabricated from one of a shape memory alloy and a shape memory plastic.

20 39. The organ retractor of claim 36, wherein the shaft is fabricated from nitinol.

40. The organ retractor of claim 36, wherein the shaft will undergo a change of configuration from about -270°C to about +100°C.

41. The organ retractor of claim 37, wherein the liquid transmits a change
25 of temperature to the shaft.

42. A retractor, comprising:
a plurality of sections defining a shaft, each of the sections having a mechanical interface for engaging an adjacent section, each section having a first

position in longitudinal alignment with an adjacent section and a second position offset from the first position so that the sections form a substantially closed shape for engaging tissue.

43. The retractor of claim 42, wherein at least one of the sections includes
5 a tongue for engaging a slot in an adjacent section.

44. The retractor of claim 42, further comprising a first cable attached to at least a first section of the plurality of sections and disposed in a passage in at least a second section of the plurality of sections, and arranged for moving the first section with respect to a second section when the first cable is pulled in a proximal direction,
10 the first cable being offset from a longitudinal axis of the shaft in a first direction.

45. The retractor of claim 44, further comprising a second cable offset from the longitudinal axis in a second direction, for returning the retractor to the first position.

46. The retractor of claim 42, further comprising a hinge disposed between
15 a first section of the plurality of sections and a second section of the plurality of sections.

47. The retractor of claim 45, wherein the hinge comprises a living hinge.